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SPECIFICATION FOR GLASS BOTTLES — DIMENSIONAL RELATIONSHIPS AND TOLERANCES

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SPECIFICATION FOR GLASS BOTTLES — DIMENSIONAL RELATIONSHIPS AND TOLERANCES

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SPECIFICATION FOR GLASS BOTTLES — DIMENSIONAL RELATIONSHIPS AND TOLERANCES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 26 February 1982, after the draft finalized by the Glass Containers Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 This standard is based on the French Specification NF H 35-077 Glass Bottles — Dimensional Relationships and Tolerances published by the Association Francaise de Normalisation (AFNOR).

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the dimensional relationships and tolerances of round blown glass bottles in terms of their capacity and degree of carbonation.

2. DIMENSIONAL RELATIONSHIPS

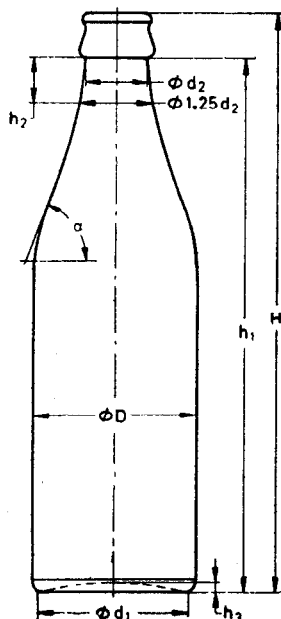
2.1 The dimensional relationships for carbonated and non-carbonated products bottles shall be as given in Table 1 and Table 2 respectively.

*Rules for rounding off numerical values (revised).

**TABLE 1 DIMENSIONAL RELATIONSHIPS OF BOTTLES
FOR CARBONATED PRODUCTS**

(Clause 2.1)

(Degree of Carbonation \geq 2g of CO₂/litre)

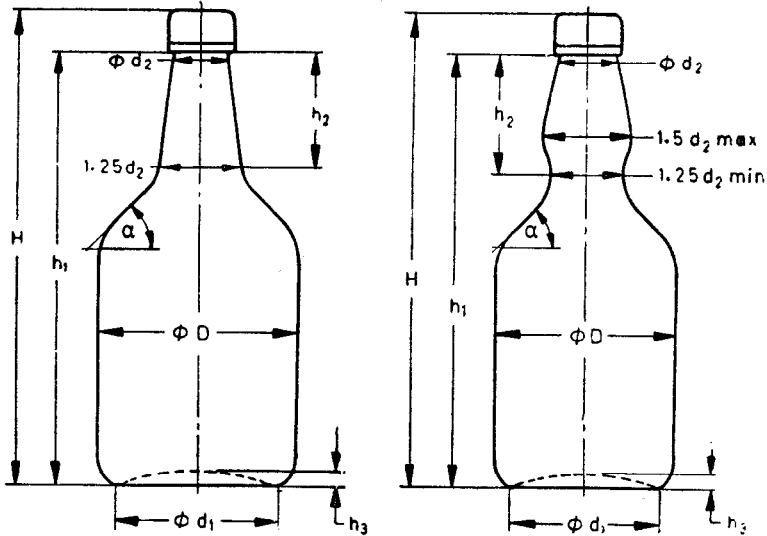


RELATIONSHIP		BRIMFUL CAPACITY ml	LIMITS	
			Min	Max
W	(W — mass in grams and	50 to 180	9.5	13.5
\bar{V}	V — capacity in centilitres)	181 to 1 100	5.6	11
$\frac{\text{Height}}{\text{Dia}}$	$\frac{H}{D}$	50 to 1 100	2.2	3.8
Collar height	$\frac{h_2}{h_1}$	50 to 1 100	—	0.25
Neck height	$\frac{h_1}{h_2}$			
Angle of shoulder α		50 to 1 100	45°	—
Stability	$\frac{d_1}{H}$	50 to 1 100	0.22	—
Concavity	$\frac{h_3}{d_1}$	50 to 1 100	—	0.11
Dia d_2		50 to 1 100	—	30 mm

**TABLE 2 DIMENSIONAL RELATIONSHIPS OF BOTTLES
FOR NON-CARBONATED PRODUCTS**

(Clause 2.1)

(Degree of carbonation < 2g of CO₂/litre)



RELATIONSHIP	BRIMFUL CAPACITY ml	LIMITS	
		Min	Max
$\frac{W}{V}$ (W — mass in grams and V — Brimful capacity in centilitres)	50 to 180 181 to 1 900	7.3 4.9	12 9.5
$\frac{\text{Height}}{\text{Dia}} \quad \frac{H}{D}$	50 to 1 900	2	4.1
$\frac{\text{Collar height}}{\text{Neck height}} \quad \frac{h_2}{h_1}$	50 to 1 900	—	0.35
Angle of shoulder α	50 to 1 900	40°	—
Stability $\frac{d_1}{H}$	50 to 1 900	0.22	—
Concavity $\frac{h_3}{d_1}$	50 to 1 900	—	0.25
Dia d_2	50 to 1 900	—	30 mm

3. TOLERANCES

3.1 Tolerances on Brimful Capacity — Table 3 gives the tolerances on brimful capacity of bottles and shall be checked on the basis of sampling tables given in IS : 2500 (Part I)-1973* with AQL 2.5 percent.

TABLE 3 TOLERANCES ON BRIMFUL CAPACITY OF BOTTLES

NOMINAL CAPACITY ml	TOLERANCE ON BRIMFUL CAPACITY	
	± percent of Nominal Capacity	± ml
50 to 100	—	3
100 „ 200	3	—
201 „ 300	—	6
301 „ 500	2	—
501 „ 1 000	—	10
1 001 „ 5 000	1	—

3.2 Dimensional Tolerances — The dimensional tolerances for height (H), diameter (D), verticality and parallelism of bottom ring shall be as given below:

Tolerance on height

$$T_H = \pm (0.6 + 0.004 H)$$

Tolerance on dia (ovality included)

$$T_D = \pm (0.5 + 0.012 D)$$

Tolerance on verticality

$$T_v = 1.5 \text{ mm for } H \leq 120 \text{ mm}$$

$$T_v = (0.3 + 0.01 H) \text{ for } H > 120 \text{ mm.}$$

Base Dia, d_1

Parallelism of Bottom Ring

Up to 20

0.45 Max

20.1 „ 30

0.6 Max

30.1 „ 40

0.7 Max

40.1 „ 50

0.8 Max

50.1 „ 60

0.9 Max

60.1 and above

1.0 Max

3.2.1 The individual values of the tolerances resulting from the formulae given in 3.2 shall be rounded to 0.1 mm. The values of D , d_1 and H are given in millimetres.

*Sampling inspection tables : Part I Inspection by attributes and by count of defects (first revision).

3.2.2 The overall height (H) diameter (D) and verticality shall be checked by the method given in Appendix A.

APPENDIX A

(Clause 3.2.2)

TEST FOR HEIGHT AND VERTICALITY OF BOTTLES

A-1. ASSEMBLY

A-1.1 Assembly for the determination of height verticality shall be as shown in Fig. 1.

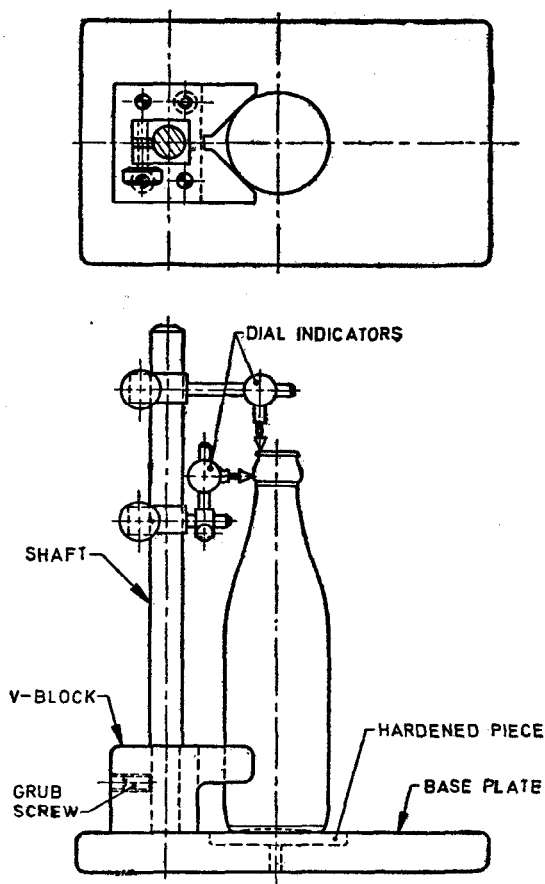


FIG. 1 ASSEMBLY FOR HEIGHT AND VERTICALITY TEST

A-2. PROCEDURE

A-2.1 Fill the bottle with water in order to give in more stability and place it on its base on the flat plate having a shaft bolted to it at right angles. Adjust the V-block mounted on the shaft in such a manner that it is in contact with due outer diameter of the bottle at about the middle. Adjust one of the dial indicator fitted to the shaft so that its measuring point comes in contact with the outer edge of the neck of the bottle and the second on the sealing surface of the bottle for measuring overall height and tolerance of the bottle. Rotate the bottle, keeping the body always in contact with the V-block. Note down the maximum deflection on the indicator.

A-2.1.1 Half of the total deflection shown by the first indicator shall be the variation in verticality.